The force of the wind and the relative values of contributing pressure gradients determine where the wind will strike. Pairs of gradients indirectly represent isobar curvature and orientation; and by grouping combinations of significant gradients in pairs, an empirical method which discounts topographical configurations as a further modifying influence is afforded, subject to the condition that as the barometric gradients become steeper, the ability of mountains or passes to deflect becomes decreasingly effective with the increased wind. With pressure gradients between the plateau and southern California in excess of 0.45 inch, the mountains to the north of the Great Valley lose their effectiveness as barriers, and desert air flows over their tops. (See table 3.)

TABLE 3.—*Wind path and significant pressure gradients*

Date	Pressure gradients		Maximum temperature	Ensuing minimum temperature					
	Los Angeles-Fresno	Los Angeles-Tonopah	Redlands	Redlands	Highland	Colton	Rialto	Bloomington	Fontana
			°	°	°	°	°	°	°
Jan. 16, 1936	+0.20	−0.06	59	[1] **30**	**41**	**32**	31	31	30
Jan. 17, 1936	+.20	+.22	63	25	30	40	**46**	**48**	**46**
Dec. 17, 1935	+.04	+.22	70	26	27	30	**43**	46	**54**

[1] Wind after 1 a. m.; average temperature thereafter 40°. Bold-face figures show where wind centered.

Rates of pressure change at significant stations are important considerations. A difference in rate between two regions represents a resultant effect free to produce or maintain wind. If the pressure builds up or decreases everywhere alike, the flow remains unchanged; when the rates of pressure change are different, the gradients become accentuated. From the study of pressure data, it has been observed that any 24-hour pressure change at Tonopah greater than twice the magnitude of the 24-hour pressure change at Los Angeles is favorable for producing wind.

How the rates of pressure change may be the basis for wind forecasts is best demonstrated by reference to the nights of December 15, 16, and 17 in table 2. The evening of December 16 showed a moderate increase in the Tonopah-Los Angeles pressure gradient, but only a slight decrease in the Fresno-Los Angeles gradient. The 24-hour pressure change showed rates at Tonopah and Los Angeles in about a 2:1 ratio. In the table, opposite December 16 but for the morning of the 17th, Rialto minimum temperature has dropped to 35°; if the wind had continued to abate in that locality, freezing temperature should logically have been expected there and at Colton the following morning. On the evening of December 17, both the Tonopah-Los Angeles and Fresno-Los Angeles pressure gradients showed decided drops, but the wind increased at all locations, including Colton. The only apparent explanation is the difference in rates of pressure change. The 24-hour change at Tonopah over Los Angeles was in the ratio of 3:1.

It is understood, of course, that the principles enumerated herein only partly cover the problem. In some years pressure on the plateau runs consistently high merely because of the hypothetical reduction to sea level; at other times the vertical structure of the air over the Great Valley determines whether the wind will blow along the surface or merely through the tops of the tallest windbreak trees. In the first case, a given pressure gradient between the plateau and southern California produces a minimum amount of wind; and, in the second case, additional considerations preclude exact analysis of impending minimum temperature. Wind seldom, if ever, completely conforms with expectation. This paper can only represent an attempt to circumvent certain frost-forecasting difficulties encountered in the field.

TROPICAL DISTURBANCE, OCTOBER 9–10, 1936

By I. R. TANNEHILL

[Marine Division, Weather Bureau, Washington, November 1936]

Only one tropical disturbance was reported during October from the North Atlantic Ocean (including the Gulf of Mexico and Caribbean Sea); this disturbance was of slight intensity; it was in evidence on October 9 and 10 on the west coast of Yucatan and in the Bay of Campeche.

The initial stages of the disturbance are described in the report of W. R. Stevens, forecaster on duty at New Orleans, as follows:

For a few days previous to October 9, conditions had been unsettled over the northwest Caribbean Sea, attended by slowly falling pressure over the Yucatan Peninsula. Heavy rains were reported on the morning of October 9 at Payo Obispo and Cozumel Island. The 8 p. m. map of October 9 showed a definite circulation over the Gulf of Campeche and the pressure at Merida had fallen to 29.70 inches, representing a 24-hour pressure fall of 0.08 inch, while pressure had risen slightly on the east coast of the Yucatan Peninsula. The reports at hand indicated that the disturbance was just forming and was probably central near Campeche.

Observations from the vicinity of the disturbance are inadequate to determine the exact course of the center; it appears to have moved south-southwestward across the Bay of Campeche and inland a short distance east of Frontera on October 10. The situation on the morning of the 11th, when the disturbance was centered north of Tapachula, is shown on chart IX.

Advisory information regarding the disturbance was disseminated on the 9th and 10th from the New Orleans forecast center.

An account of tropical disturbances which occurred during October in the Pacific Ocean near Mexico will be found on page 343.